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CC-Link IE TSN 対応
リモート I/O モジュール
Ezi-IO シリーズ

ユーザーズマニュアル
(デジタル I/O モジュール)

Ezi-IO® Network Input/Output
CC-Link IE TSN DIO



FASTECH
Fast Accurate Smooth Motion

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Chapter 1 Safety and Installment Precautions

1.1 Before using

- Thank you for purchasing FASTECH's Ezi-IO CC-Link IE TSN DIO.
- This manual includes operating instructions, safety precautions, specifications and etc. of Ezi-IO CC-Link IE TSN DIO.
- Please use the Ezi-IO CC-Link IE TSN DIO safely after a full comprehension of the User Manual.
- Make sure that the end users read this manual and then keep the manual in a place for future reference.

1.2 Precautions

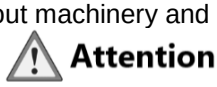
1.2.1 General Precautions

- The User Manual may be altered for product improvement, specification changes, or for a more accessible manual without prior notification. Please confirm there is a User Manual along with the purchased product.
- Should you damage or mislocate your Usual Manual, please contact your authorized dealer or head office for a new one.
- Any alterations made to the product by user is not in the range of the warranty thus, the company will not be held responsible.

1.2.2 Installment Precautions

- This product must be used indoors, between the temperatures of 0°~ 50°C.
- If the case goes over 50°C, it must be cooled down.
- It must not be installed near direct sunlight, magnetic or radioactive objects.
- In the case 2 or more are installed side by side, the products must be at least 20mm apart vertically and 50mm apart horizontally.

1.2.3 Safety Precautions

- Make sure you have a full comprehension of the User Manual before installation, operation, examination and or repairs. Also, please use the product after a full comprehension about machinery and safety information.
- In this manual, the safety precautions are classified into two levels:  and  .

	**Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.**
	**Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.**

- Though the contents correspond to  , under some circumstances, results may be more serious. Observe all safety instructions.

1.2.3.1 Design Precautions

⚠ Warning	**Please design an appropriate protection circuit to protect the system from defects in external power or other connected equipment.** **Please take steps to safely protect the system from communication errors (emergency shutdown, interlock circuits, limit circuits, etc.).**

1.2.3.2 Installment Precautions

⚠ Attention	**Please check for damages or omitted parts.** There is a danger of damage to the product in the case of the installment or operation of an abnormal product. **Take exceptional caution when moving the product.** If dropped, the product can be damaged and cause an injury if dropped on the foot. **Please use non-flammables such as metals in place of handling the product.** There is a risk of fire. **If there are several Ezi-IO CC-Link IE TSN DIO installed in a closed space,** **please install cooling fans to keep the temperature around the modules below 50℃.** In the case overheating, there is a danger of fires or other accidents.
⚠ Warning	**Installment, connection, handling, operation and inspection or fault diagnosis should be done by qualified personnel.** It can be a cause for fires, injuries or damage of device.

1.2.3.3 Wiring Instructions

⚠ Attention	**Properly observe regular range for module power input voltage.** It can be a cause for fires or damages. **Closely abide by the wiring diagram for connection.** It can be a cause for fires or malfunction.
⚠ Warning	**Make sure the power is OFF before working on the module.** There is a risk of electric shock or fire.

1.2.3.4 Operation and Setting Precaution

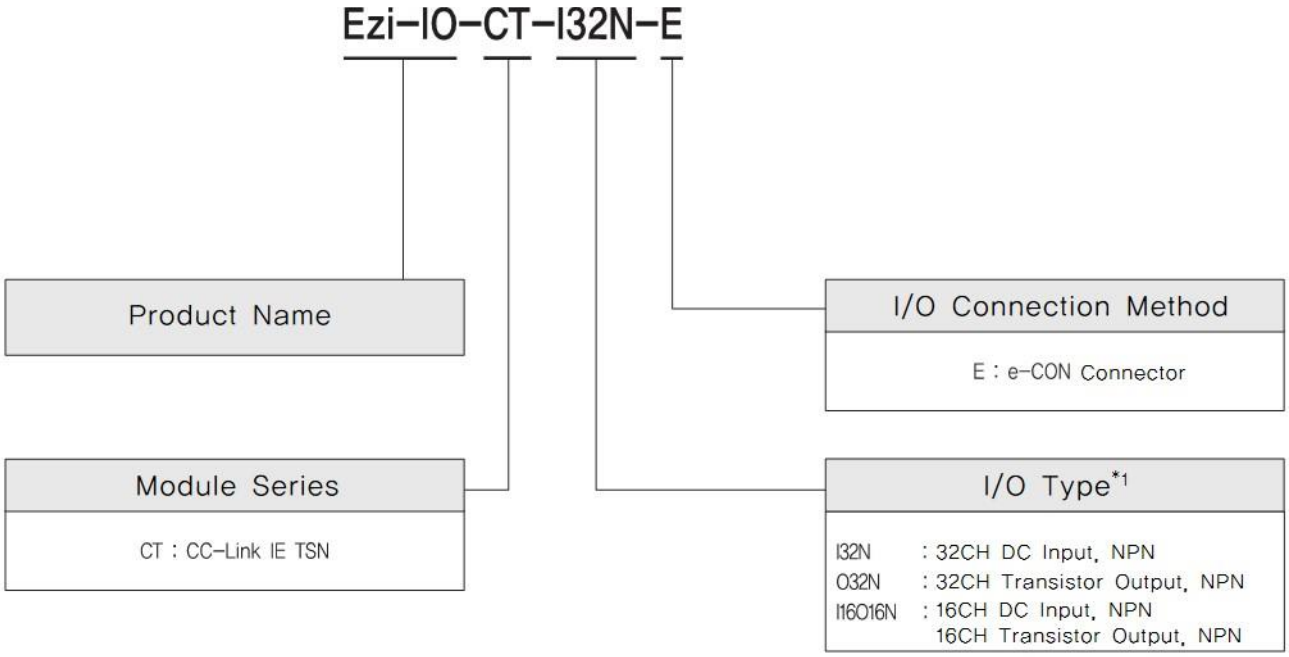
⚠ Attention	**Make sure you have a full comprehension of the User Manual before changing settings.** There is a risk of damaging machinery or the product.

1.2.3.5 Repair and Inspection

⚠ Warning	**The Ezi-IO CC-Link IE TSN DIO should be repaired and inspected only after considerable time has passed since shutting off the circuit power.** There is a risk of electric shock from remaining condenser power. **Do not change wiring when there is a current flow.** There is a risk of electric shock, damage to product or machinery. **Modifications are strictly prohibited.** There is a risk of electric shock, damage to product or machinery and any modifications will not be subject for after-sales service from FASTECH.

Chapter 2 Product Composition

2.1 Ezi-IO CC-Link IE TSN DIO Product Name



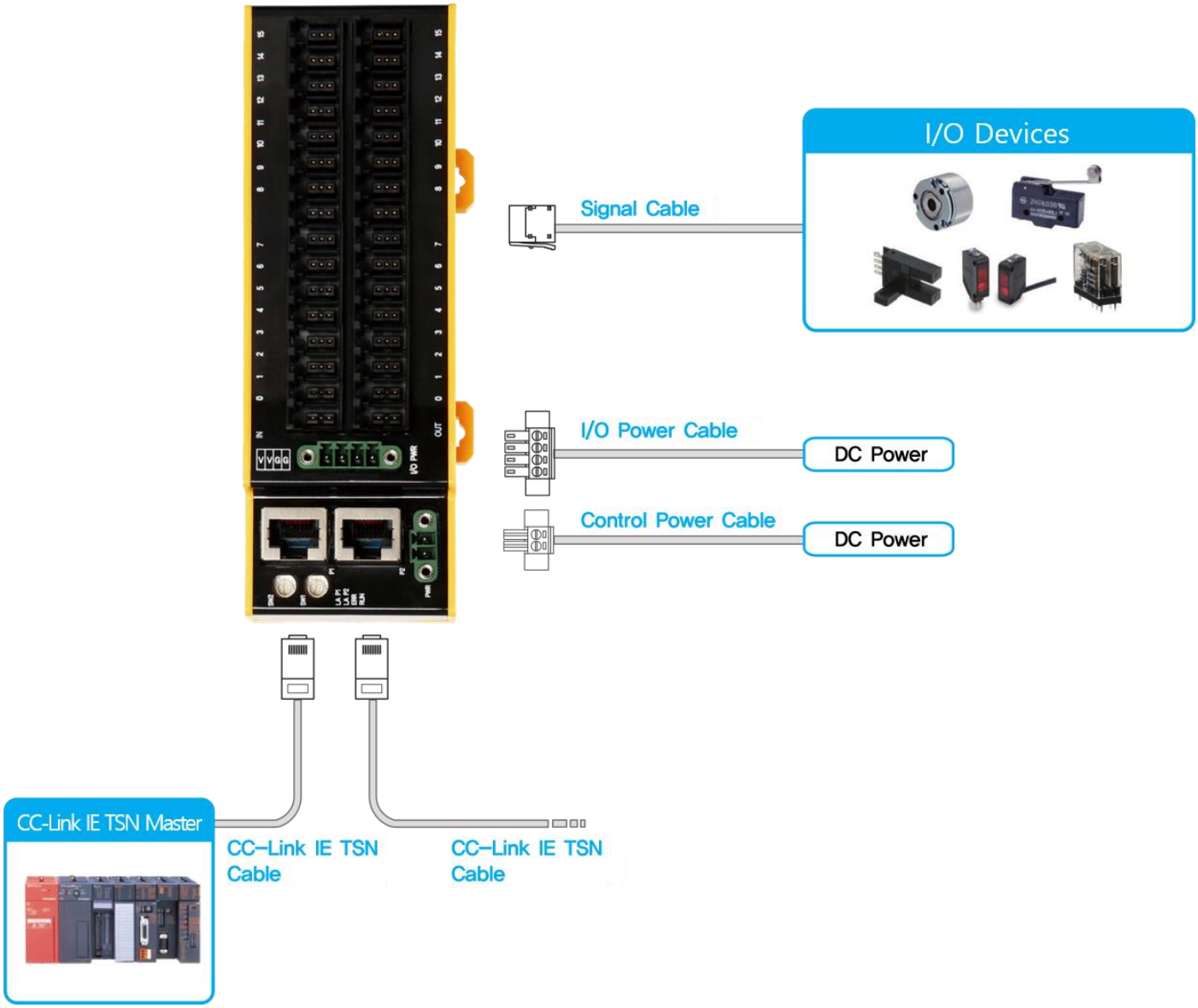
*1: NPN and PNP are classified as follows according to I/O type.

DC Input	NPN	Positive Common Type
	PNP	Negative Common Type
Transistor Output	NPN	Sink Output
	PNP	Source Output

2.2 Product List

Part Number	Remarks
Ezi-IO-CT-I32N-E	32CH e-CON Type
Ezi-IO-CT-O32N-E	
Ezi-IO-CT-I16O16N-E	

2.3 System Diagram



Chapter 3 Product Specifications

3.1 CC-Link IE TSN Specifications

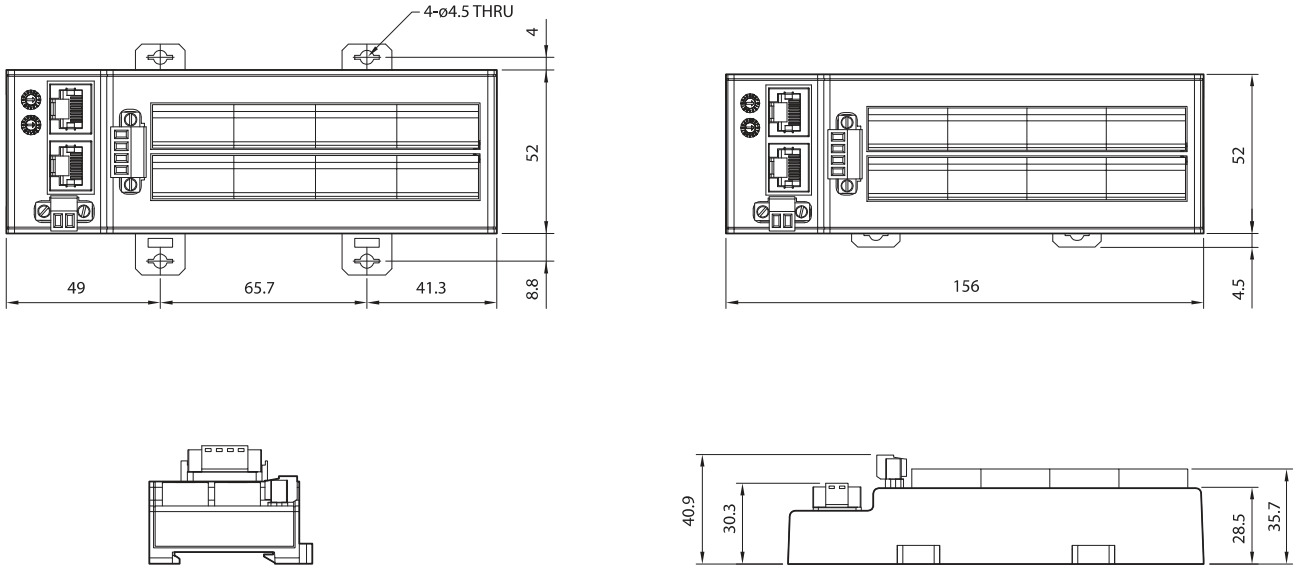
Communication method	CC-Link IE TSN
Physical layer	Ethernet – 100BASE-TX
Connector	RJ45 LA P1/LA P2
Station type	Remote device station
Authentication class	Class B
Communication speed	1 Gbps
Topology	Line/Star, Ring
Communication cycle	Over 200 μs
Cable	STP(Shielded Twisted Pair) cable, Category 5e or higher/ maximum length 100m

3.2 Product Standard

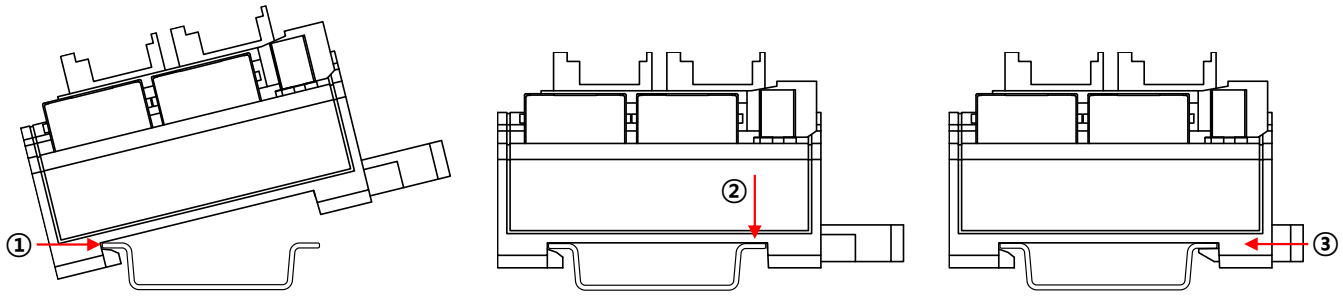
Product name			Ezi-IO-CT-I32N-E	Ezi-IO-CT-O32N-E	Ezi-IO-CT-I16O16N-E
Input voltage			DC24V±10%		
Current consumption			· Control power: Maximum 150mA · Input/ output power: Maximum 110mA (Excluding load current)	· Control power: Maximum 180mA · Input/ output power: Maximum 70mA (Excluding load current)	· Control power: Maximum 170mA · Input/ output power: Maximum 90mA (Excluding load current)
Operating Condition	Temperature		· In use: 0~50℃ · In storage: -20~70℃		
	Humidity		· In use: 35~85% RH (non-condensing) · In storage: 10~90% RH (non-condensing)		
	Vibration resistance		0.5g		
Function	Input	Number of input channels	32 CH	-	16 CH
		Rated input voltage	DC24V		DC24V
		Rated input current	5mA/ points		5mA/ points
		Isolation method	Photocoupler isolation		Photocoupler isolation
		Common method	16 CH/COM		16 CH/COM
		Input filter	Maximum 40ms (Filter resolution: 200μs)		Maximum 40ms (Filter resolution: 200μs)
		Off → On response time	Under 10μs		Under 10μs
		Off → Off response time	Under 70μs		Under 70μs
	Output	Number of output channels	-	32 CH	16 CH
		Rated output voltage		DC24V	DC24V
		Rated output current		0.5A/CH (3A/COM)	0.5A/CH (3A/COM)
		Isolation method		Photocoupler isolation	Photocoupler isolation
		Common method		16 CH/COM	16 CH/COM
		Off → On response time		4μs or lower	4μs or lower
		Off → Off response time		190μs or lower	Under 190μs
LED display			· Power status display (PWR) · Module operating status display (RUN) · Motion abnormality (ERR) · CC-Link IE TSN communication connection display (LA P1, LA P2) · Input/Output status display (0~31)		· Power status display (PWR) · Module operation status display (RUN) · Motion abnormality (ERR) · CC-Link IE TSN communication connection display (LA P1, LA P2) · Input/Output status display (0~15/ 0~15)

3.3 Product Size

[unit: mm]
* Install product on a DIN rail with a width of 35mm.



3.4 Installing Product



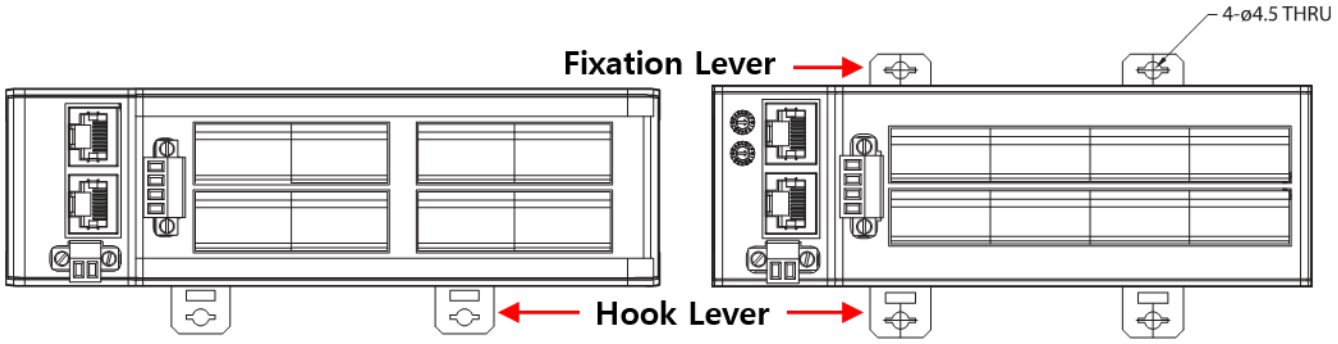
The Ezi-IO CC-Link IE TSN DIO can be installed on a DIN rail with a width of 35mm. The installation order is as follows.

① Hang the notch on the back on the DIN rail.
② Slide the product in the direction of the DIN rail so the opposite side of the notch reaches the DIN rail.
③ Push the hook lever in the direction of the arrow and fixate.

Information

The Ezi-IO CC-Link IE TSN DIO has been designed to effectively radiate through the DIN rail. Thus, cooling the DIN rail is a more effective way to radiate the product.

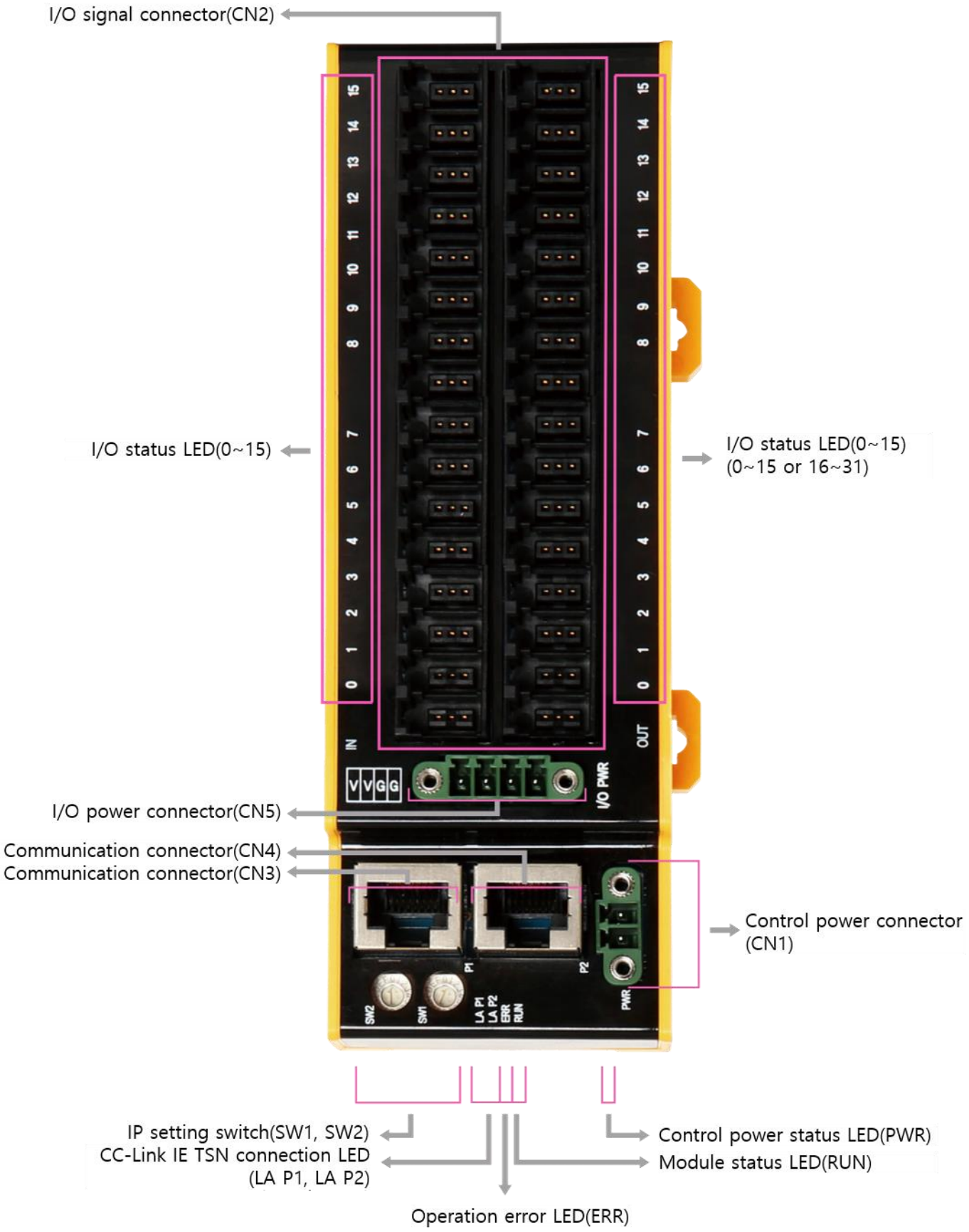
Information



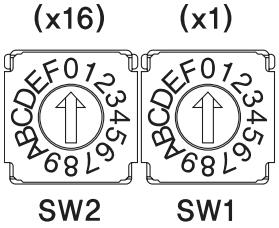
The Ezi-IO CC-Link IE TSN DIO comes with 2 hook levers and 2 fixation levers. The hook levers and fixation levers each have holes for M4 screws so the module can be installed and fixated with screws.

* The fixation levers are not used for the DIN rail installments.

Chapter 4 Exterior Names and Functions



4.1.1 CC-Link IE TSN IP setting switch (SW1, SW2)



The switch that sets the IPv4 of CC-Link IE TSN communication IP address.
Ex) SW1 is 7, SW2 is 5
(5×16)+(7×1) = 87
IP: Set to 192.168.3.87.
* The IP set by the rotary switch is applied when the power of the module is turned on.

4.1.2 Status display LED

Display	Color	Status	Explanation
PWR	Red	OFF	Without input of power
		ON	With input of power

Display	Color	Status	Explanation
RUN	Green	OFF	Initialized or power OFF status
		ON	With input of power

Display	Color	Status	Explanation
ERR	Red	OFF	Without errors or power OFF
		ON	Data link error

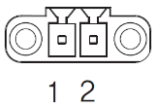
Display	Color	Status	Explanation
LA P1/LA P2	Green	OFF	Link deactivated
		ON	Link activated

Display	Color	Status	Explanation
0~31 0~15 / 0~15	Green	OFF	Input module: Input OFF state Output module: Output OFF state
		ON	Input module: Input ON state Output module: Output ON state

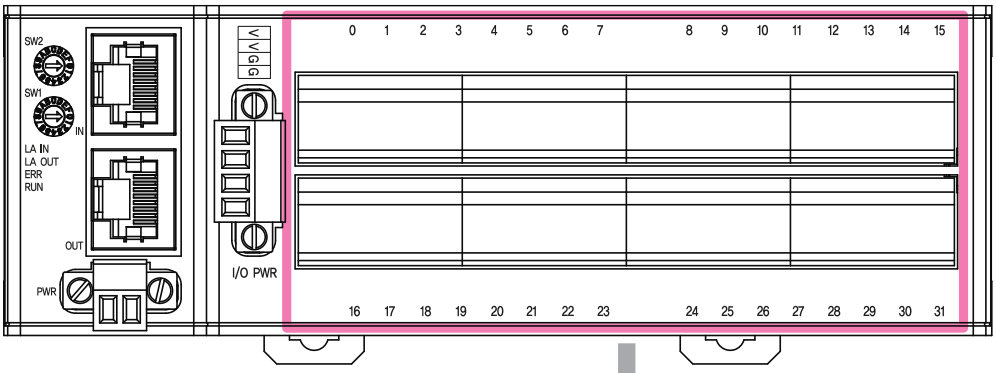
* In the case of Ezi-IO-CT-I16O16N-E modules, it is displayed as 0~15 / 0~15.

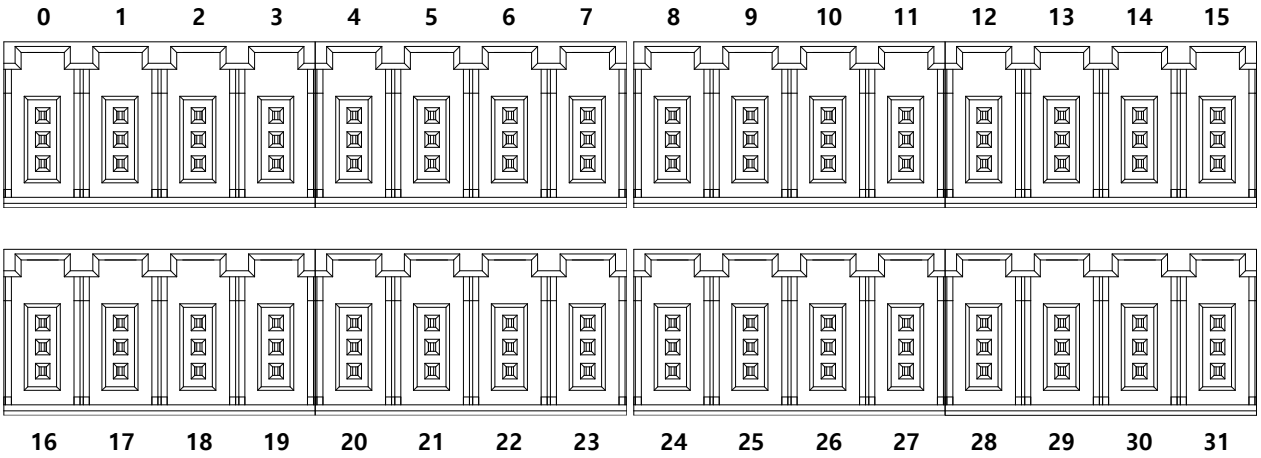
4.1.3 Power connector (CN1)

Number	Function	Input/ Output
1	DC24V	Input
2	GND	Input

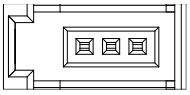


4.1.4 Input / Output connector (CN2)





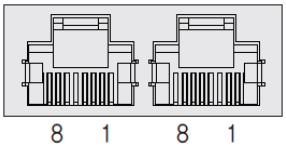
Number*	Display*	Pin	Function	Input/Output
0~31	0~31 0~15 / 0~15	①	EXT_DC24V	Output
		②	SIGNAL	Input/Output
		③	EXT_GND	Output



* In the case of Ezi-IO-CT-I16O16N-E modules, it is displayed as 0~15 / 0~15.

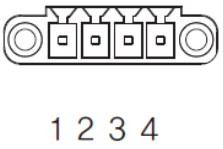
4.1.5 CC-Link IE TSN Communication connection connector (CN3, CN4)

Number	Function
1	TD +
2	TD +
3	RD+
4	----
5	----
6	RD -
7	----
8	----
Connector Hood	F.GND



4.1.6 Input/ output power connector (CN5)

Number	Function	Input/Output
1	EXT_DC24V	Input
2	EXT_DC24V	Input
3	EXT_GND	Input
4	EXT_GND	Input



4.1.7 Components

- **Connection Connector**

Function	Product name	Standard	Manufacturer
Control power connector (CN1)	Terminal block	MC421-38102	DECA
Input/Output power connector (CN5)	Terminal block	MC421-38104	DECA
Input/Output connector (CN2)	e-CON plug connector	CNE-P03-YW	Autonics

* The connector above is provided with the product. When using a different component, please check if it meets standard requirements.

4.1.8 Sold separately

- **CC-Link IE TSN Communication Cable**

Function	Product name	Standard	Others
CC-Link IE TSN communication connection (CN3, CN4)	CGNR-EC-0001F	1	• STP(Shielded Twisted Pair) Cable • Category 5e or higher • Maximum usage: 100m • Fixed cable
	CGNR-EC-0002F	2	
	CGNR-EC-0003F	3	
	CGNR-EC-0005F	5	

* For lengths not mentioned in the figure above (in 1m units), please inquire FASTECH.

Chapter 5 External Wiring Diagram

Ezi-IO CC-Link IE TSN DIO provides e-CON connector type products. e-CON connectors responds to the industry standards and can be easily connected to various equipment thus simplifying and reducing wiring work.

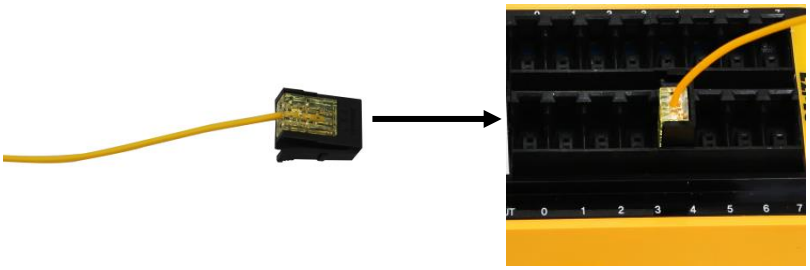


Figure 5-1. e-CON plug connector binding

5.1 External Wiring Diagram (Ezi-IO-CT-I32N-E)

All e-CON connector signals consist of inputs. It can receive up to 32 digital data from peripheral devices.

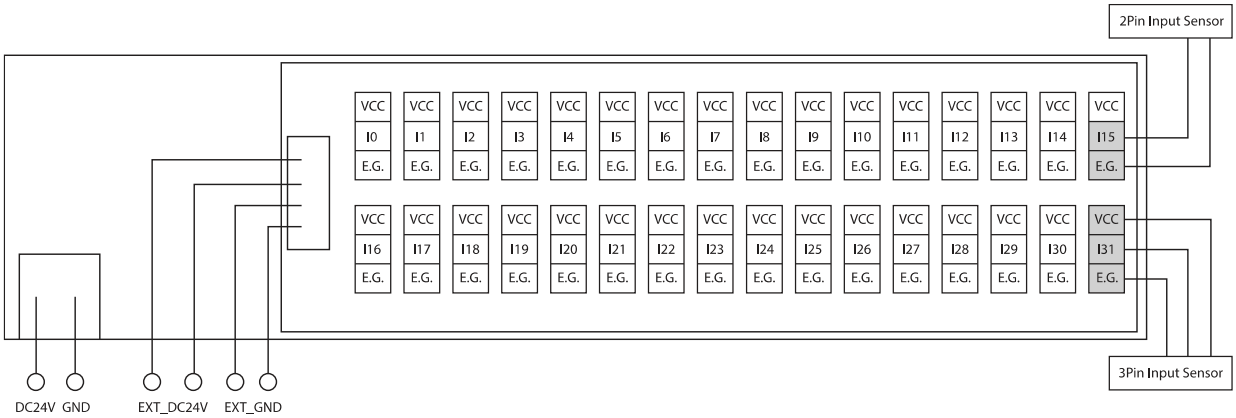


Figure 5-2. Ezi-IO-CT-I32N-E

* The VCC and E.G. is supplied by the input/output power connection connector(CN5).
* Example) 2Pin Input Sensor: Limit switch, etc.
  3Pin Input Sensor: Location sensor, photo sensor, proximity sensor, etc.
  2Pin Output Device: Brake, Solenoid, Photocoupler, etc.

5.2 External Wiring Diagram (Ezi-IO-CT-O32N-E)

All e-CON connector signals consist of inputs. It can receive up to 32 digital data from peripheral devices.

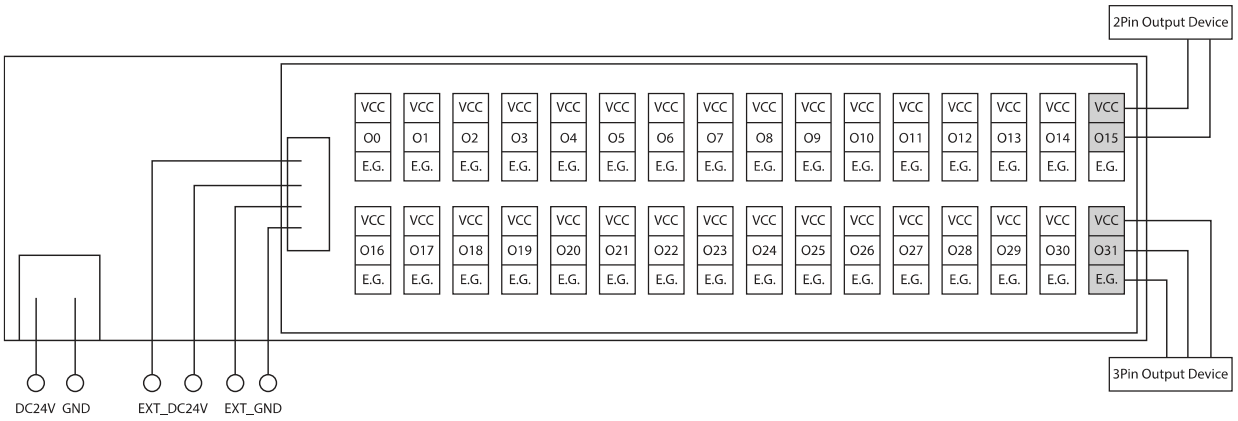


Figure 5-3. Ezi-IO-CT-O32N-E

5.3 External Wiring Diagram (Ezi-IO-CT-I16O16N-E)

The e-CON connector signals are a combination of inputs and outputs. It can receive up to 16 digital data from peripheral devices and can output up to 16 digital data from peripheral devices.

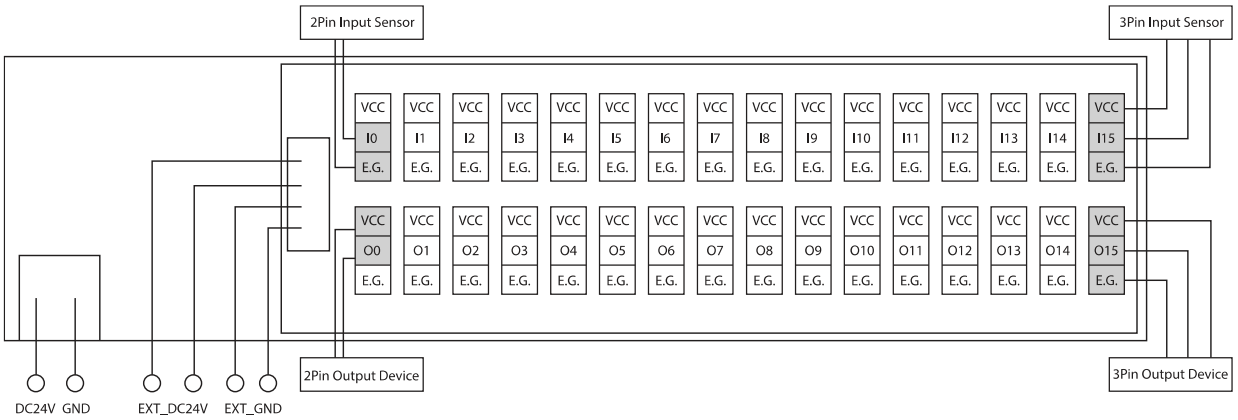


Figure 5-4. Ezi-IO-CT-I16O16N-E

* The VCC and E.G. are supplied by the Input/Output power connection connector(CN5).
* Example) 2Pin Input Sensor: Limit switch, etc.
  3Pin Input Sensor: Location sensor, photo sensor, proximity sensor, etc.
  2Pin Output Device: Brake, Solenoid, Photocoupler, etc.

5.4 Internal Circuit Diagram

5.4.1 Input

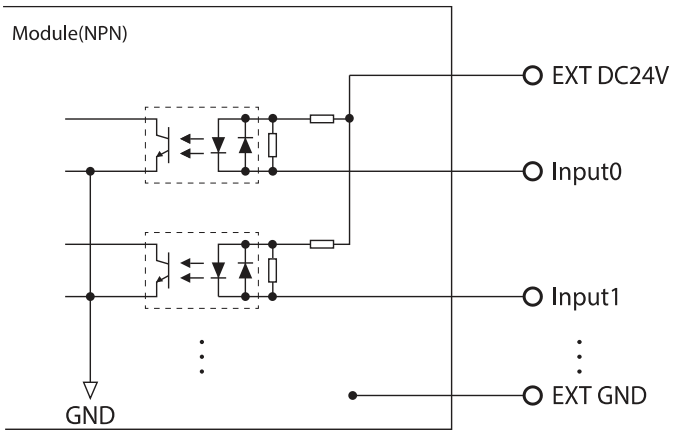


Figure 5-5. NPN input internal circuit diagram

5.4.2 Output

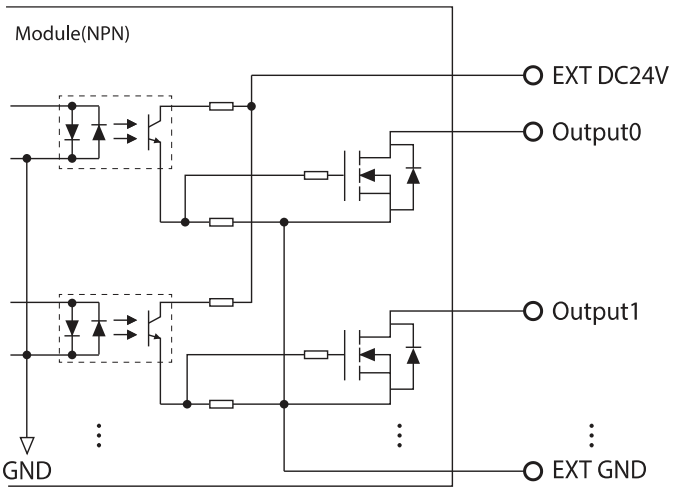


Figure 5-6. NPN output internal circuit diagram

5.5 Peripheral Device Wiring

The Ezi-IO CC-Link IE TSN DIO can easily connect to peripheral devices with simple wiring using the e-CON connector. The information of various peripheral devices wiring are as below.

Sensor name		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
Pin number	Wire color	Pin number	Pin function	Possible Ezi-IO models

5.5.1 Photo Sensor

① EE-SX672A(NPN) Dark-ON Operation

EE-SX672A		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
+	Black	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
-	Black	3	GND	
OUT	Black	2	IN	

② EE-SX672A(NPN) Light-ON Operation

EE-SX672A		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
+	Black	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
L	Black	Connect to + in case of Light-ON		
-	Black	3	GND	
OUT	Black	4	IN	

③ PM-K65(NPN) Light-ON Operation

PM-K65		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
4	Blue	3	GND	
2	Black	2	IN	

④ PM-K65(NPN) Dark-ON Operation

PM-K65		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
4	Blue	3	GND	
3	White	2	IN	

• Dark-ON Operation: In this operation mode, the through-beam sensor creates output when the amount of light entering the receiver of the photo sensor stops or decreases.
• Light-ON Operation: In this operation mode, the diffuse-reflective sensor creates output when the amount of light entering the receiver of the photo sensor increases.

5.5.2 Position Sensor

① S125TL-1-24-R(NPN)

SMAT-8T		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
2	White	3	GND	
3	Blue			
4	Black	2	IN	

5.5.3 Limit Switch

① SS-5GL2T(NPN)

SMAT-8T		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
2	White	3	GND	
3	Blue			
4	Black	2	IN	

② MS0850506F035P1A(NPN)

MS0850506F035P1A		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
Common	Black	3	GND	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
NO	-	-	-	
NC	Black	2	IN(24V)	

5.5.4 Proximity Sensor

① E2B-M12KN08-WP-C1 2M(NPN) NO Operations

E2B-M12KN08-WP-C1 2M		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
3	Blue	3	GND	
4	Black	2	IN	

② E2B-M12KN08-WP-C1 2M(NPN) NC Operations

E2B-M12KN08-WP-C1 2M		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
3	Blue	3	GND	
2	Black	2	IN	

③ GX-F12A(NPN)

GX-F12A		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Brown	1	24V	Ezi-IO-CT-IN32N-E Ezi-IO-CT-IN16O16N-E
2	Blue	3	GND	
3	Black	2	IN	

5.5.5 Brake

① BXW-03-10R(NPN)

BXW-03-10R		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
+	Black	1	24V	Ezi-IO-CT-O32N-E Ezi-IO-CT-IN16O16N-E
-	Black	2	OUT(GND)	

5.5.6 Lamp

① S125TL-1-24-R(NPN)

S125TL-1-24-R		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
2	Black	1	24V	Ezi-IO-CT-O32N-E Ezi-IO-CT-IN16O16N-E
1	Red	2	OUT(GND)	

* The fuse must be attached to the GND

5.5.7 Solenoid Valve

① HD-F6F6-B4(NPN)

HD-F6F6-B4		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
IN	Black	1	24V	Ezi-IO-CT-O32N-E Ezi-IO-CT-IN16O16N-E
OUT	Black	2	OUT(GND)	

② VXE2110-01(NPN)

VXE2110-01		Module type		Possible Ezi-IO models
Pin number	Wire color	e-CON connector	Function	
1	Red	1	24V	Ezi-IO-CT-O32N-E Ezi-IO-CT-IN16O16N-E
2	Black	2	OUT(GND)	

Chapter 6 CC-Link IE TSN Communication

6.1 CC-Link IE TSN Specifications

CC-Link IE TSN is a CC-Link communication method based on Ethernet adopted TSN (Time Sensitive Network) technology. CC-Link IE TSN applies the time synchronization technology (IEEE802.1AS) and the time-sharing method (IEEE802.1Qbv) for real time communication, enabling high-speed, high-precision control communication. Moreover, it allows communication with other open networks or IT systems within the same network, resulting in improved degrees of freedom in terms of system configuration and drastic cuts in wiring.

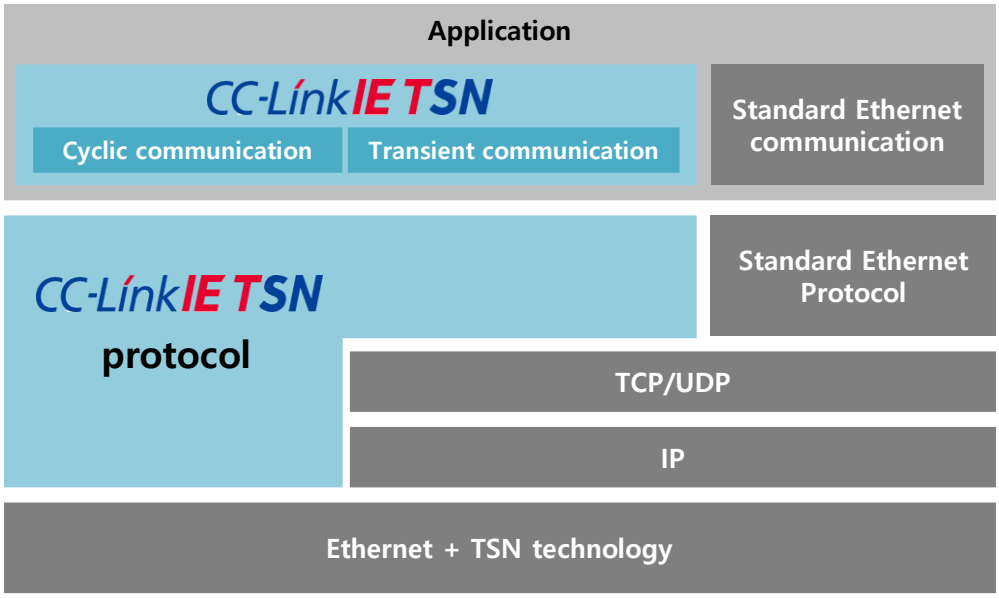


Figure 6-1. CC-Link IE TSN Application Structure

6.2 CSP+ File

CSP+ is an abbreviation for CC-Link Family System Profile Plus. It is an XML data file to express the information of connecting devices of CC-Link IE Field, CC-Link IE TSN. This file includes specification, input/output, parameter information and etc.
Also, it provides each network device's unique information to the engineering development environment which manages the mobility, operation and maintenance of devices. Since it is all in the same format, the information obtainment management can be shared.

Information

The CSP+ file can be downloaded from the manufacturer's homepage.

6.3 I/O Device Map

6.3.1 Ezi-IO CC-Link IE TSN IN32

RWw	Remote Register Output
0	Input filter count
1	not used
2	not used
3	not used

RX	Remote Input
0	Input channel 00
1	Input channel 01
2	Input channel 02
3	Input channel 03
4	Input channel 04
5	Input channel 05
6	Input channel 06
7	Input channel 07
8	Input channel 08
9	Input channel 09
10	Input channel 10
11	Input channel 11
12	Input channel 12
13	Input channel 13
14	Input channel 14
15	Input channel 15
16	Input channel 16
17	Input channel 17
18	Input channel 18
19	Input channel 19
20	Input channel 20
21	Input channel 21
22	Input channel 22
23	Input channel 23
24	Input channel 24
25	Input channel 25
26	Input channel 26
27	Input channel 27
28	Input channel 28
29	Input channel 29
30	Input channel 30
31	Input channel 31

6.3.2 Ezi-IO CC-Link IE TSN OUT32

RY	Remote Output
0	Output channel 00
1	Output channel 01
2	Output channel 02
3	Output channel 03
4	Output channel 04
5	Output channel 05
6	Output channel 06
7	Output channel 07
8	Output channel 08
9	Output channel 09
10	Output channel 10
11	Output channel 11
12	Output channel 12
13	Output channel 13
14	Output channel 14
15	Output channel 15
16	Output channel 16
17	Output channel 17
18	Output channel 18
19	Output channel 19
20	Output channel 20
21	Output channel 21
22	Output channel 22
23	Output channel 23
24	Output channel 24
25	Output channel 25
26	Output channel 26
27	Output channel 27
28	Output channel 28
29	Output channel 29
30	Output channel 30
31	Output channel 31

6.3.3 Ezi-IO CC-Link IE TSN IN16OUT16

RY	Remote Output
0	Output channel 00
1	Output channel 01
2	Output channel 02
3	Output channel 03
4	Output channel 04
5	Output channel 05
6	Output channel 06
7	Output channel 07
8	Output channel 08
9	Output channel 09
10	Output channel 10
11	Output channel 11
12	Output channel 12
13	Output channel 13
14	Output channel 14
15	Output channel 15

RX	Remote Input
0	Input channel 00
1	Input channel 01
2	Input channel 02
3	Input channel 03
4	Input channel 04
5	Input channel 05
6	Input channel 06
7	Input channel 07
8	Input channel 08
9	Input channel 09
10	Input channel 10
11	Input channel 11
12	Input channel 12
13	Input channel 13
14	Input channel 14
15	Input channel 15

RWw	Remote Register Output
0	Input filter count
1	not used
2	not used
3	not used

Chapter 7 Network Parameter Settings

7.1 Setting Master Station

7.1.1 Communication Period Setting

Set the communication cycle of the master station. The Ezi-IO CC-Link IE TSN DIO supports 1 Gbps communication speed so the master station communication cycle can be set on a broad range. There is a difference in the communication cycles available according to the "Setting in Units of 1us" setting.

Setting in Units of 1us	Instruction
Set	Set within the range of 125 us ~ 10000 us
Not Set	Choose among 125us, 250us, 500us, 1000us, 2000us, 4000us, 8000us

7.1.2 Network Topology

The Ezi-IO CC-Link IE TSN DIO can choose between line/star topology and ring topology depending on the system configuration.

Network Topology	Instruction
Line/Star	The system can be made with the line/star topology or both.
Ring	The system can be made with ring topology.

7.1.3 Communication mode

The communication mode can be set according to usage environment and purpose.

Communication mode	Explanation
Unicast	1:1 communication between the master station and remote station. The local station cannot control the remote station and is faster than the multicast mode. This mode is appropriate when there is no local station at the communication system or when the local station does not need to control the remote station.
Multicast	The cycle data is shared with local stations. The local station can control the remote station and is slower than the unit case mode. This mode is appropriate when the local station needs to control the remote station.

7.2 Product Settings

Setting items		Setting scope	Instruction
Remote input and output settings (RX, RY)	Points	0 ~ 32	Set quantity of remote input and output
	Start	-	The starting point of the RX/RY remote will be displayed.
	End	-	The end point of the input/output RX/RY remote is displayed.
Remote register settings (RWr, RWw)	Points	0 ~ 4	Set quantity of remote register input and output.
	Start	-	The starting point of RWr/RWw remote register is displayed.
	End	-	The end point of RWr/RWw remote register is displayed.
Network synchronization settings (Network Synchronous Communication)		Asynchronous	Ezi-IO CC-Link IE TSN DIO does not support synchronization modes. Settings to Asynchronous
Communication cycle setting (Communication cycle setting)		• Basic cycle • Medium speed • Low speed	I/O module and communication cycle setting.

Chapter 8 Function Explanation

8.1 Open Collector Output

8.1.1 Open Collector Motion

An open collector is a common type of output scheme which functions like a switch where the output port is either connected to the ground (ON) or disconnected (OFF) as shown in figure 8-1. The port does not output a particular voltage/current but is connected with the base of an internal NPN transistor whose collector is externalized (“Open” Collector). External circuits determine the voltage/current.
The term was deviated from NPN transistors but also applies to PNP transistors and is commonly used in place of Open Drain for FET devices as well.

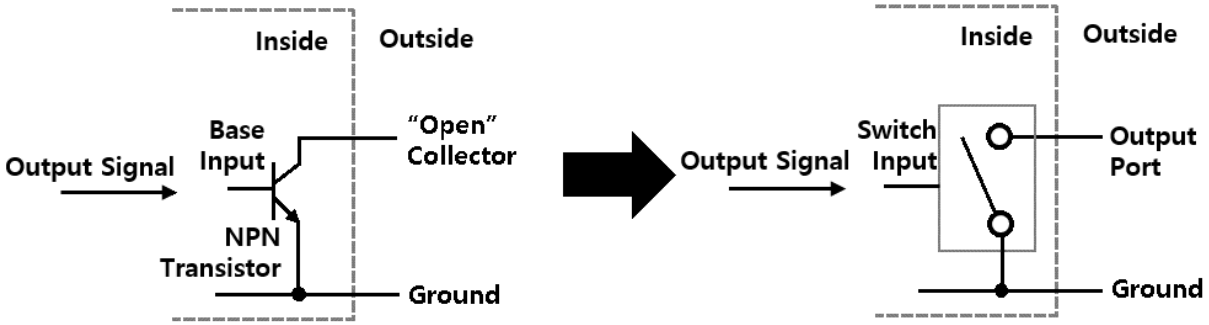


Figure 8-1. Open collector output and switch

8.1.2 Open Collector Method

• NPN type (N type)

NPN type uses an NPN transistor at the output and when the transistor is turned ON, load current flows inward. Also referred to as 'SINK type'.

The 2 external connection methods have been marked in figure 8-2. The first is when the NPN output provides a passage to the load current. The other end of the load must be connected to the (+) voltage. This is also the case when the solenoid valve is turned ON/OFF using the NPN output.

The other is when the NPN outlet is connected to the (+) voltage of an external input with pull-up resistor and delivers the ON/OFF signal of the outlet. In this case, the (+) voltage level can be changed according to the pull-up power. This method is usually used to connect open collector type sensors.

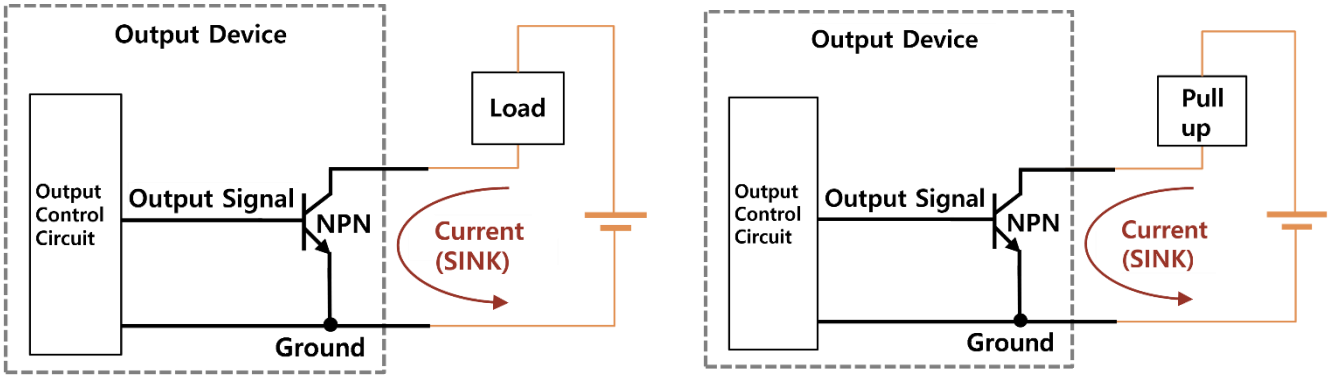


Figure 8-2. NPN output method connection

• PNP type (P type)

The PNP type uses an PNP transistor at the output and when the transistor is turned ON, load current flows in. Also referred to as 'SOURCE TYPE'.

Figure 8-3 is a PNP output connection method. The NPN output supplies the current towards the load current. The other end of the load must be connected to the ground. It is mostly used to turn ON/OFF the power supply of a load circuit like LED.

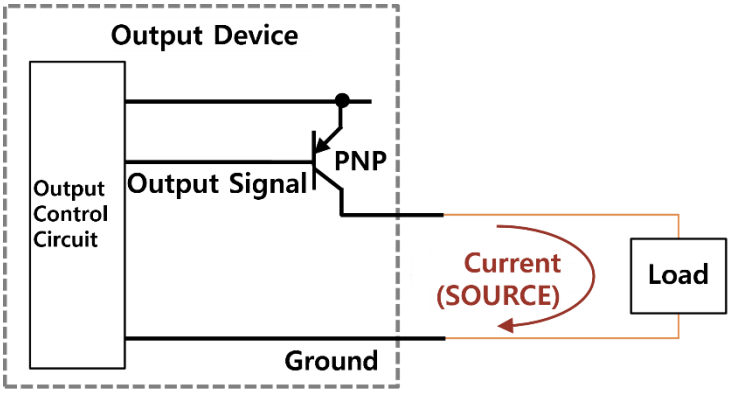


Figure 8-3. PNP output method connection

8.2 Ezi-IO CC-Link IE TSN DIO Input/Output

8.2.1 Output Signal

All of Ezi-IO CC-Link IE TSN DIO outlets are open collector types and there are NPN(N type) and PNP (P type) products depending on the type of open collector method they support. The output circuit is based on 24V and the maximum output current is 200mA for each channel (Option A products maximum 500mA/CH) Please check the standards of peripheral devices before using.

• NPN type (N type) product wiring

If a peripheral device requires power, connect the output of Ezi-IO CC-Link IE TSN DIO to the VCC(+24V), GND, signal of the peripheral device (3-wire wiring). If the peripheral device is a simple load like the solenoid valve, connect +24V and signal to each end of the load but if there is a separate power to the peripheral device, only connect the GND and signal (2-wire wiring).

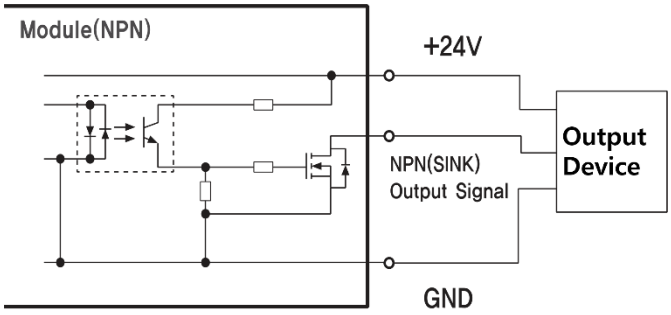


Figure 8-4. Example of NPN output 3-wire wiring

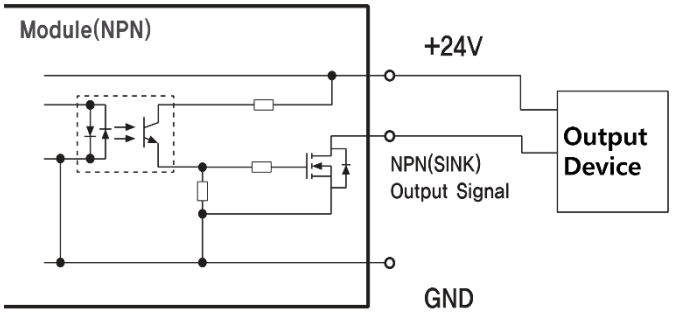


Figure 8-5. Example of NPN output 2-wire wiring

• PNP type (P type) product wiring

If a peripheral device requires power, connect the output of Ezi-IO EtherCAT DIO to the VCC(+24V), GND and signal of the peripheral device (3-wire wiring). If the peripheral device is a simple load like the solenoid valve, connect GND and signal to each end of the load (2-wire wiring).

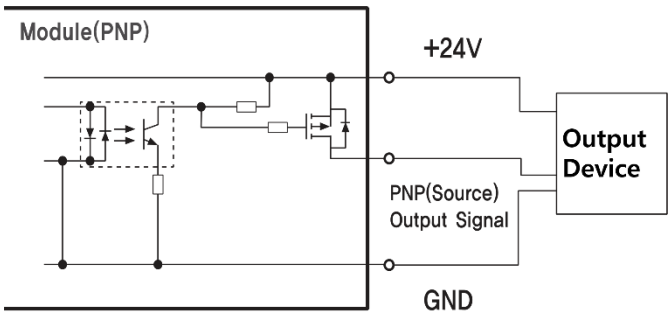


Figure 8-6. Example of PNP output 3-wire wiring

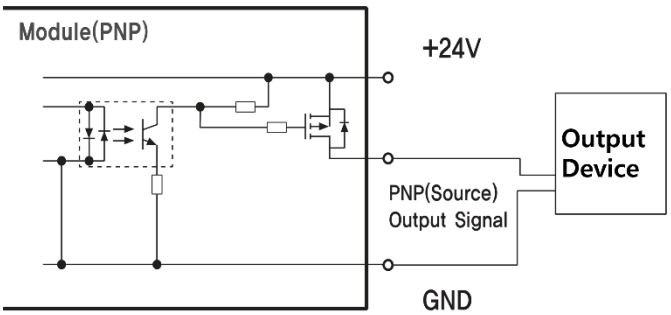


Figure 8-7. Example of PNP output 2-wire wiring

8.2.2 Input Signal

All of Ezi-IO CC-Link IE TSN DIO inputs are photocouplers and there are NPN(N type) and PNP (P type) products depending on the type of output method of connecting peripheral devices.

- **NPN type (N type):** The outputs of connected peripheral devices are NPN open collectors and in the stance of peripheral devices, current flows in (SINK type)
- **PNP type (P type):** The outputs of connected peripheral devices are PNP open collectors and in the stance of peripheral devices, current flows out (SOURCE type)

The output circuit is based on 24V and the maximum output current is 5mA for each channel. Please check the standards of peripheral devices before using.

• NPN type (N type) product wiring

If a peripheral device requires power, connect the input of Ezi-IO to VCC(+24V), GND, signal of peripheral devices (3-wire wiring). If the peripheral device is a simple load like the solenoid valve, connect GND and signal to each end of the load but if there is a separate power to the peripheral device, only connect the GND and signal. (2-wire wiring)

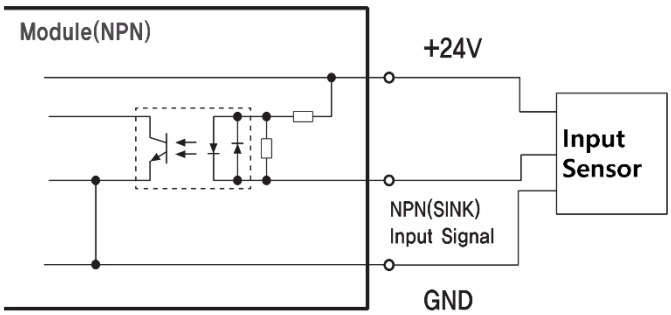


Figure 8-8. Example of NPN input 3-wire wiring

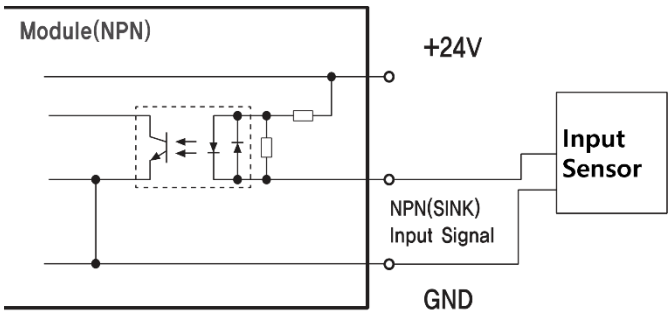


Figure 8-9. Example of NPN input 2-wire wiring

• PNP type (P type) product wiring

If peripheral device requires power, connect the input of Ezi-IO to VCC(+24V), GND, Signal of peripheral devices (3-wire wiring). When peripheral devices are simple input points like switches, connect only +24V and signals to each end of the switch (2-wire wiring).

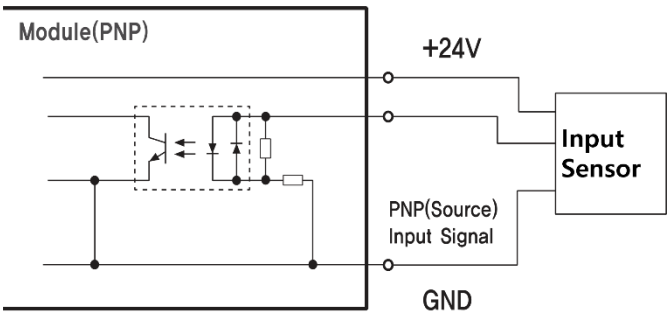


Figure 8-10. Example of PNP input 3-wire wiring

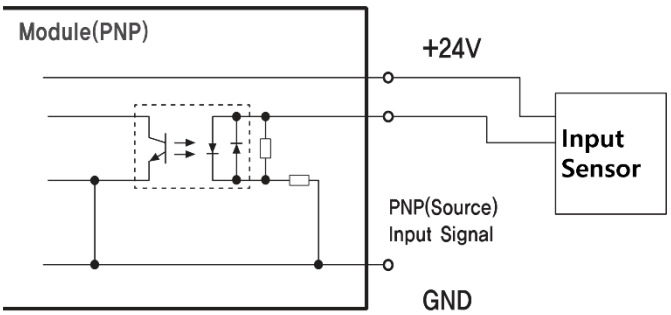


Figure 8-11. Example of PNP input 2-wire wiring

8.3 DIO Control

8.3.1 Digital I/O Output

The output can be controlled by adjusting the RY0 ~ RY31 value of the I/O device map.
The n in RYn controls the output status of the nth channel and the output status according to each value is as follows.

Value	Instruction
0	When the output signal (transistor) is off and current dos not flow out
1	• NPN: When the output signal (transistor) is on, current flows inward, otherwise called a SINK status. • PNP: When the output signal (transistor) is on, current flows out, otherwise called a SOURCE status.

Table 8-1. The output status according to the RYn data value

8.3.2 Digital I/O Input

The signal coming in from the product's input can be confirmed from the I/O device map's RX0 ~ RX31 value.
The n in RXn is the nth channel's input status and the input status according to each value is as follows.

Value	Instruction
0	The input signal's photocoupler is at a non-conduction status, with no external current flowing
1	• NPN: The input signal's photocoupler is at a conduction status, with current flowing out • PNP: The input's photocoupler is at a conduction status, with current flowing in

Table 8-2. The input status according to the RXn data value

8.4 Input filter

8.4.1 Explanation

This function prevents the change of data when there is high frequency noise such as chattering included in the incoming signals.
Ezi-IO CC-Link IE TSN DIO samples input signals every 200us. When the same input signal as the predetermined value of the input filter is sampled consecutively, it accepts it as valid input data.

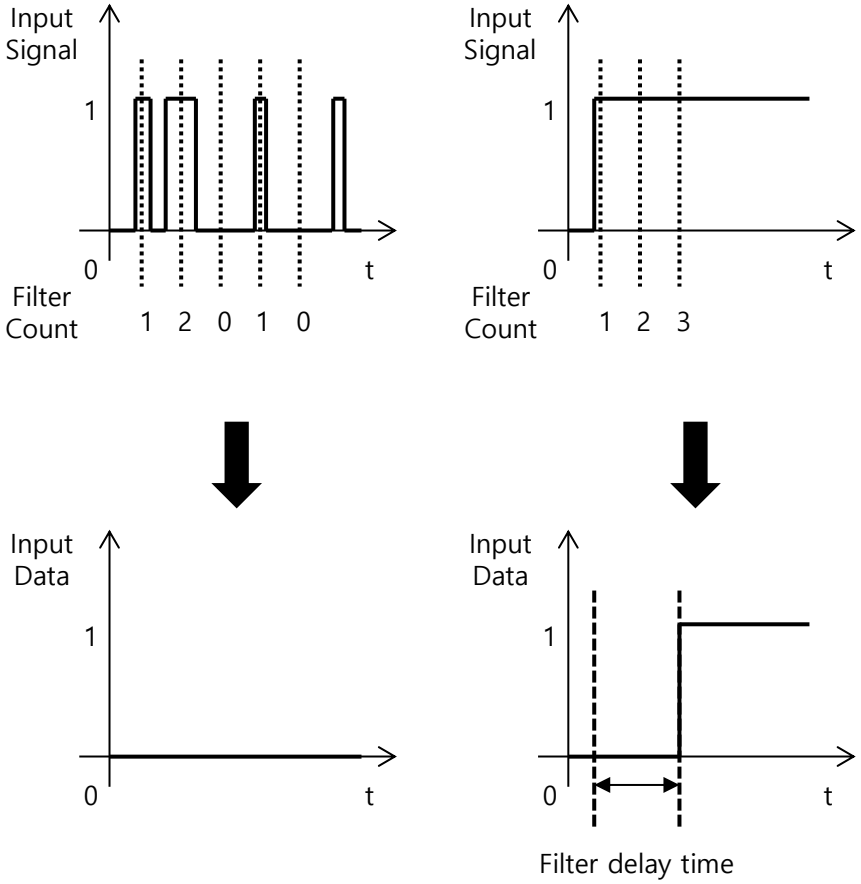


Figure 8-12. Input filter motions

Input filter values are between 0~200 and there could be a maximum of 40ms filter delay time depending on the setting value.

8.4.2 Setting Method

The filter value can be set by adjusting the remote register output value, RWw0.

Chapter 9 Settings and Operation

9.1 System configuration example



Figure 9-1. System configuration example

- Master station (IP address: 192.168.3.253)
  - Base module: R33B
  - Power supply module: R61P
  - CPU module: R08CPU
  - Communication master module: RJ71GN11-T2
- Remote station (IP address: 192.168.3.1)
  - I/O Module: Ezi-IO CC-Link IE TSN IN16OUT16
- Engineering tool: GX-Works3 (version used in manual: 1.081K)

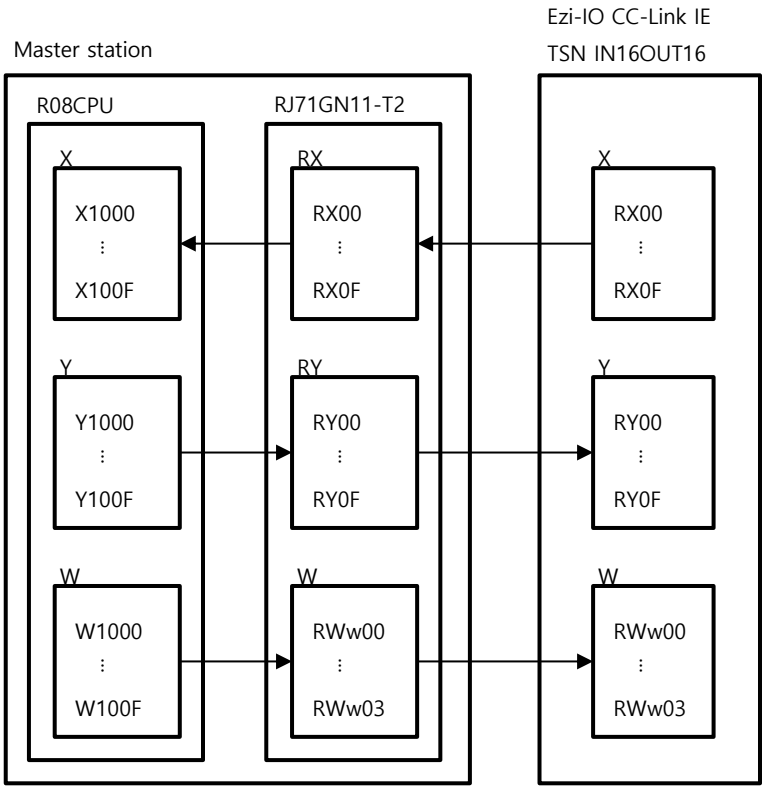


Figure 9-2. Example system link device setting

9.2 Produce Setting Steps

1. Add CSP+ file.
   - Click on [Tool] – [Profile Management] – [Register] menu above GX-Works3.
   - Find CSP+(.zip file) downloaded from FASTECH homepage.

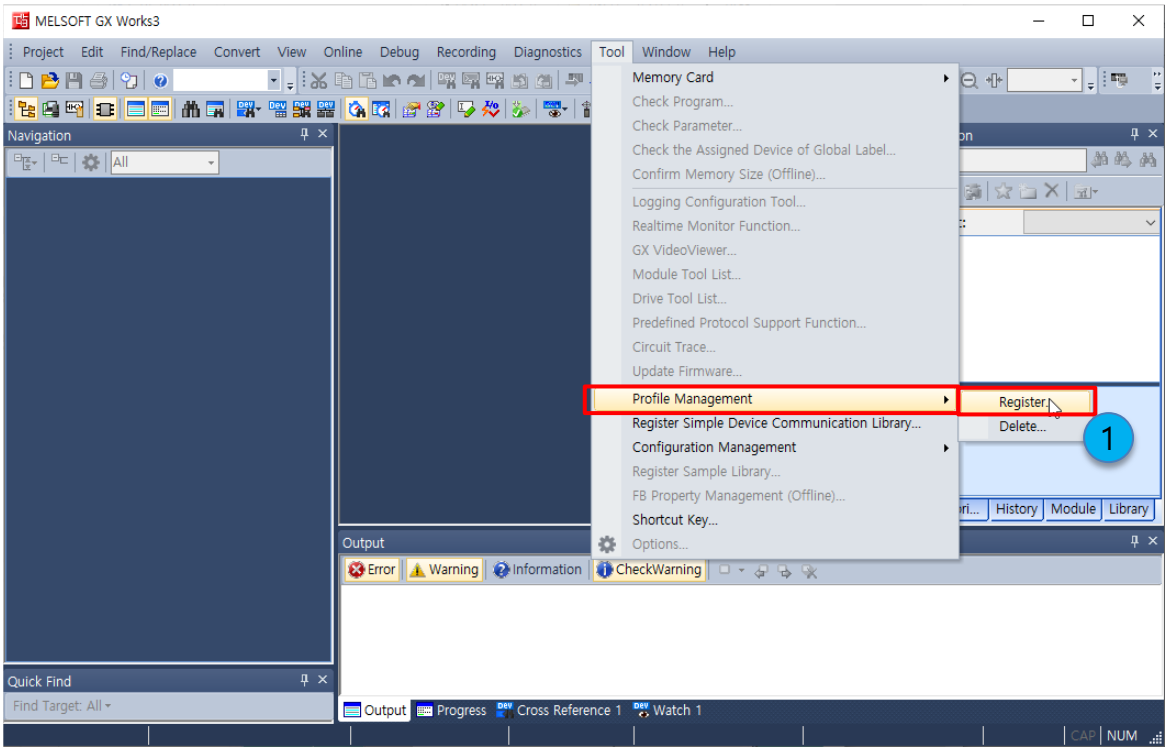


Figure 9-3. CSP+ file registration 1

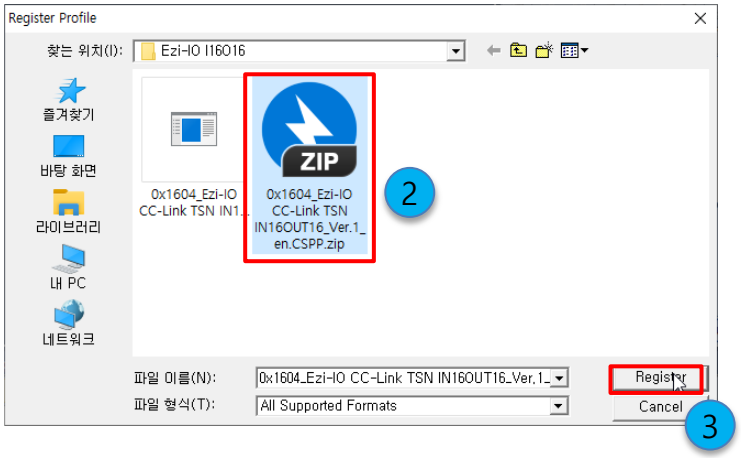


Figure 9-4. CSP+ file registration 2

2. Create project.

- Create project with [Project]-[New] menu.
- Select CPU type and language then press 'OK' to create project.

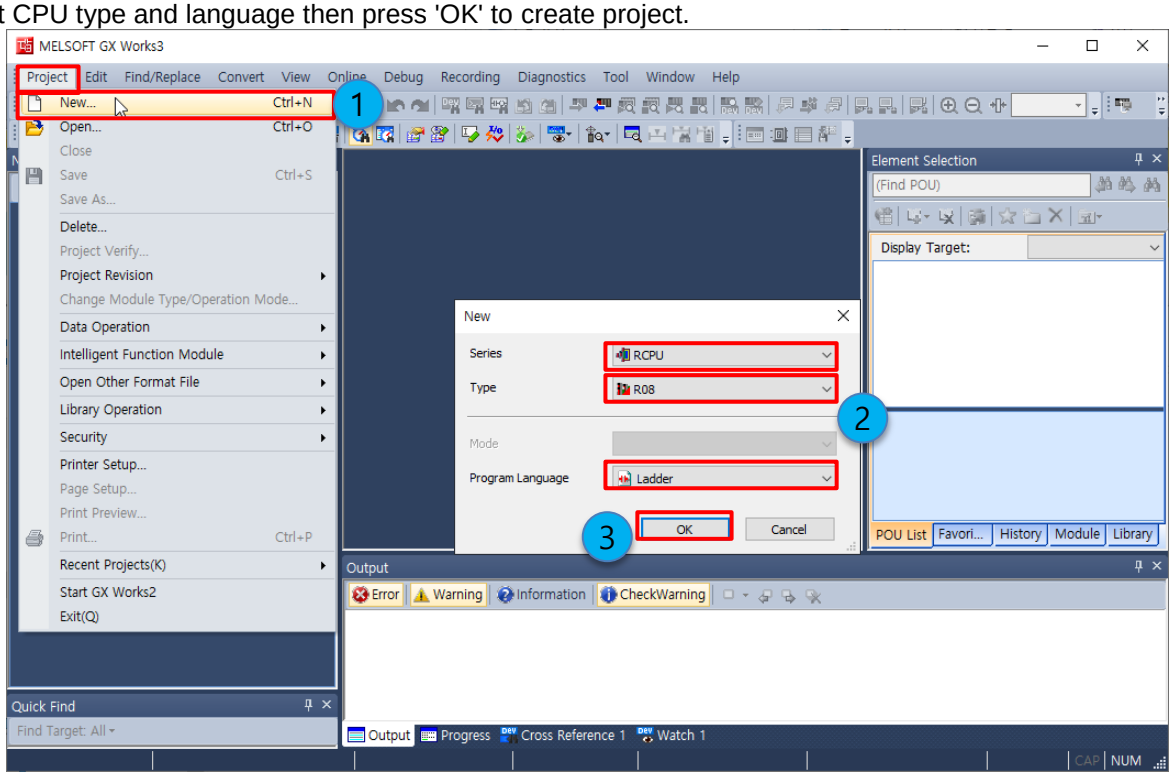


Figure 9-5. Create project

3. Set module.

- Double click on [Module Configuration] on the left side's Navigation.
- First, add base module from right side's Element Selection then add power module, CPU, network module considering user's system.

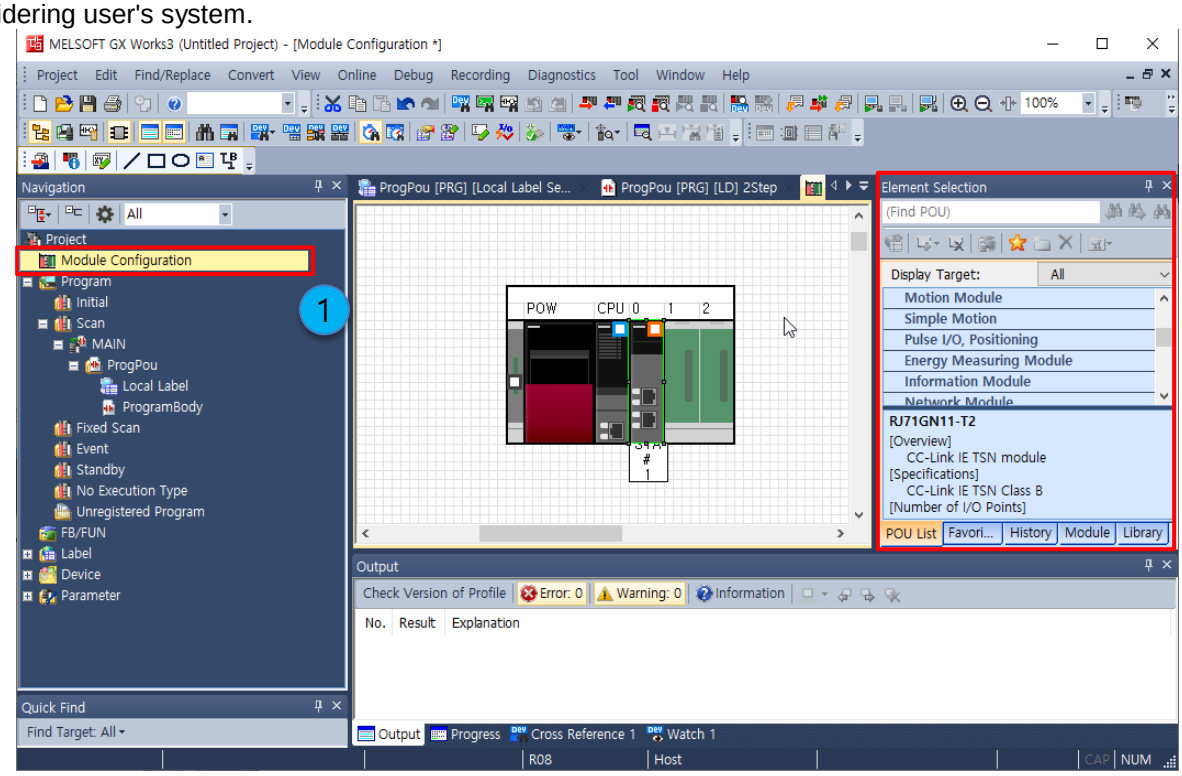


Figure 9-6. Set module.

4. Set CPU module.

- You can set the CPU parameter on [Parameter]-[R08CPU]-[CPU Parameter] on the left side's Navigation.
- To use as the CC-Link IE TSN master in this setting, [Memory/Device Setting]-[Link Direct Device Setting] must be changed to Extended Mode (iQ-R Series Mode).

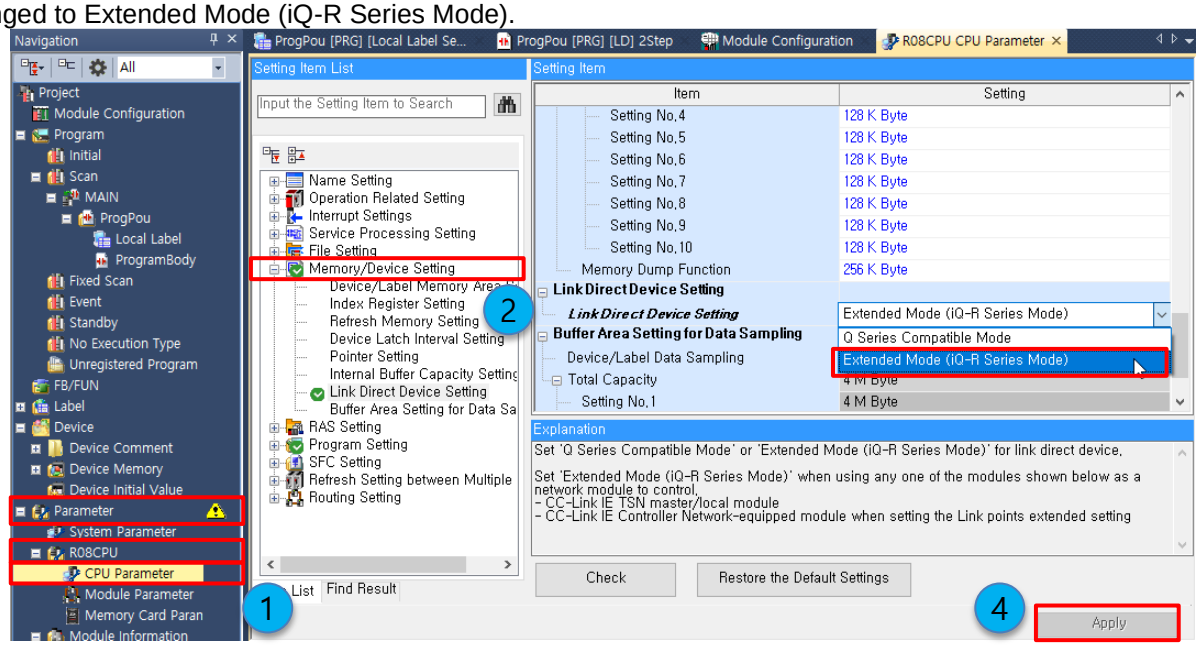


Figure 9-7. CPU module setting

5. Set communication master module (R71GN11-T2).

- You can see the available master module in the [Parameter]-[Module Information] on the left side. Double click the module you wish to set.
- Set station type, IP address and subnet mask in [Required Settings].

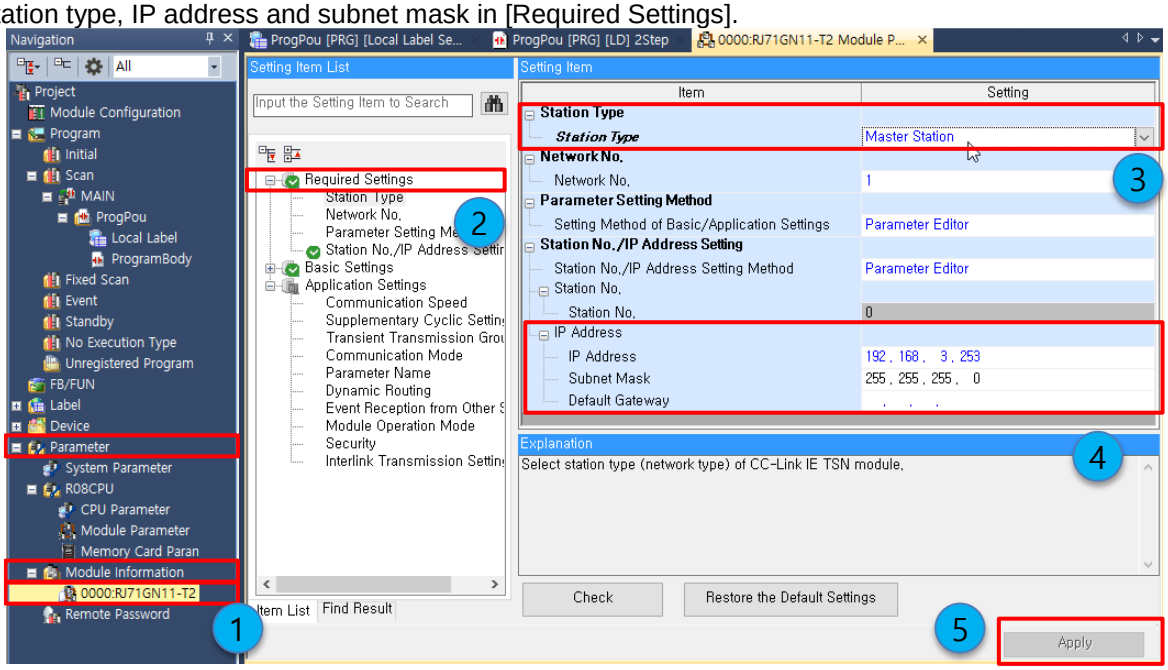


Figure 9-8. Communication module required settings

- Double click [Basic Setting]-[Refresh Settings] and set link device. The details for the settings are as the following figures.

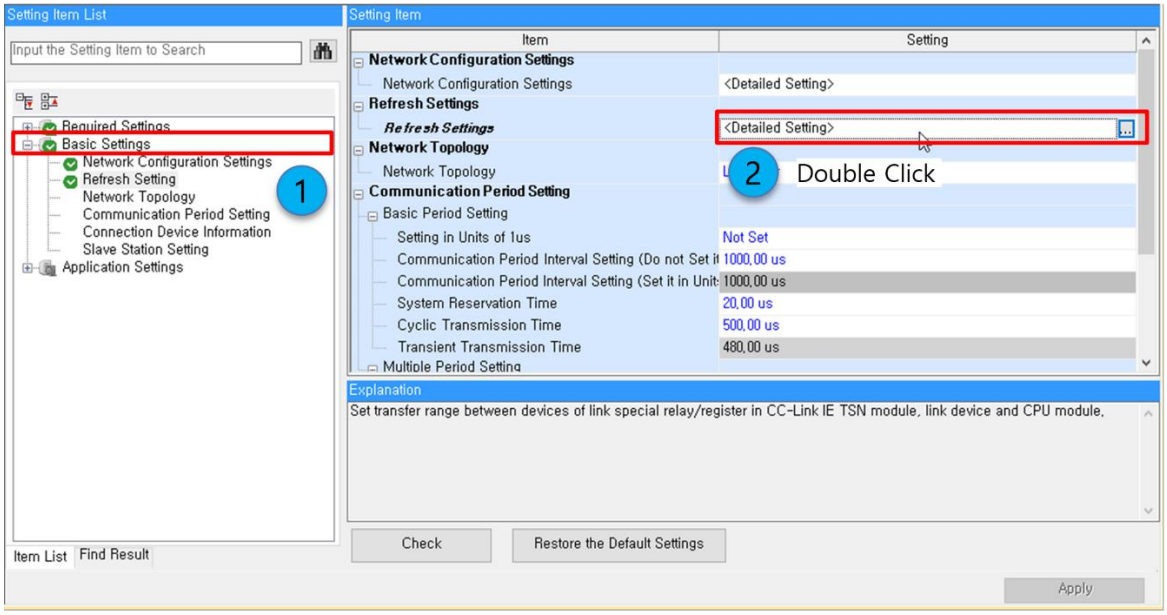


Figure 9-9. Communication module link device setting 1

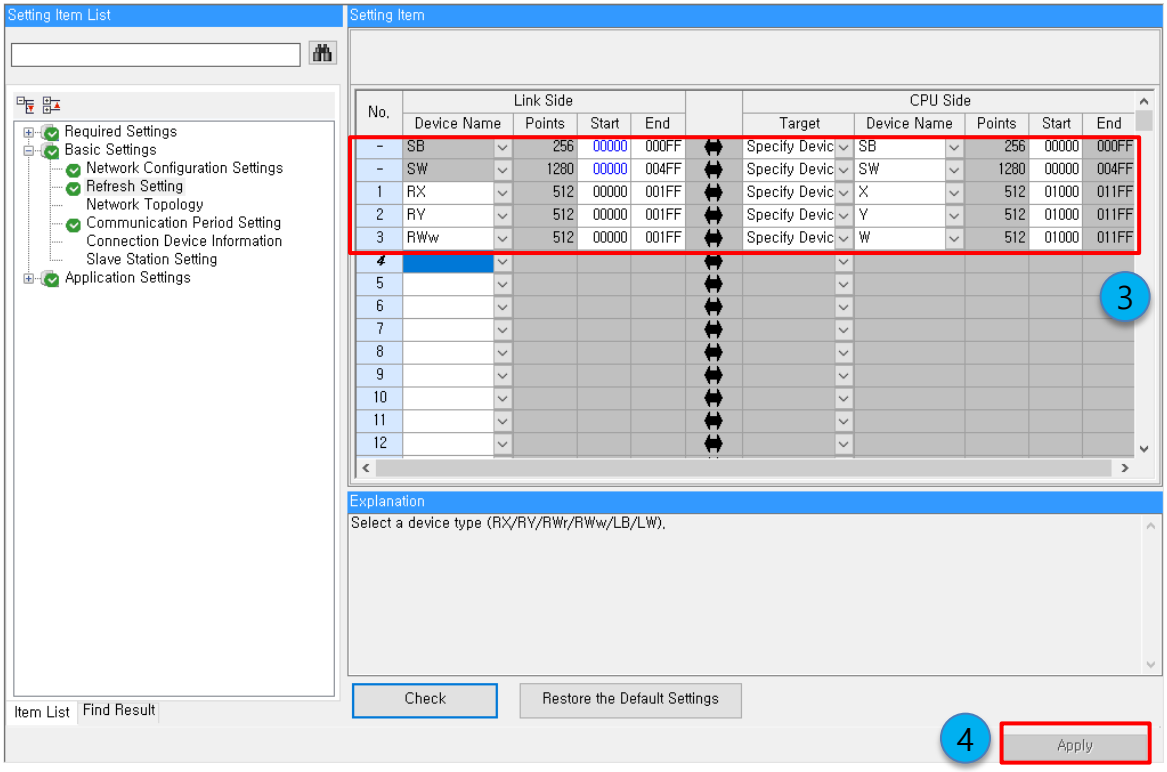


Figure 9-10. Communication module link device setting 2

- Double click on [Basic Setting]-[Network Configuration Settings] and set network configuration. The details for the settings are as the following figures.

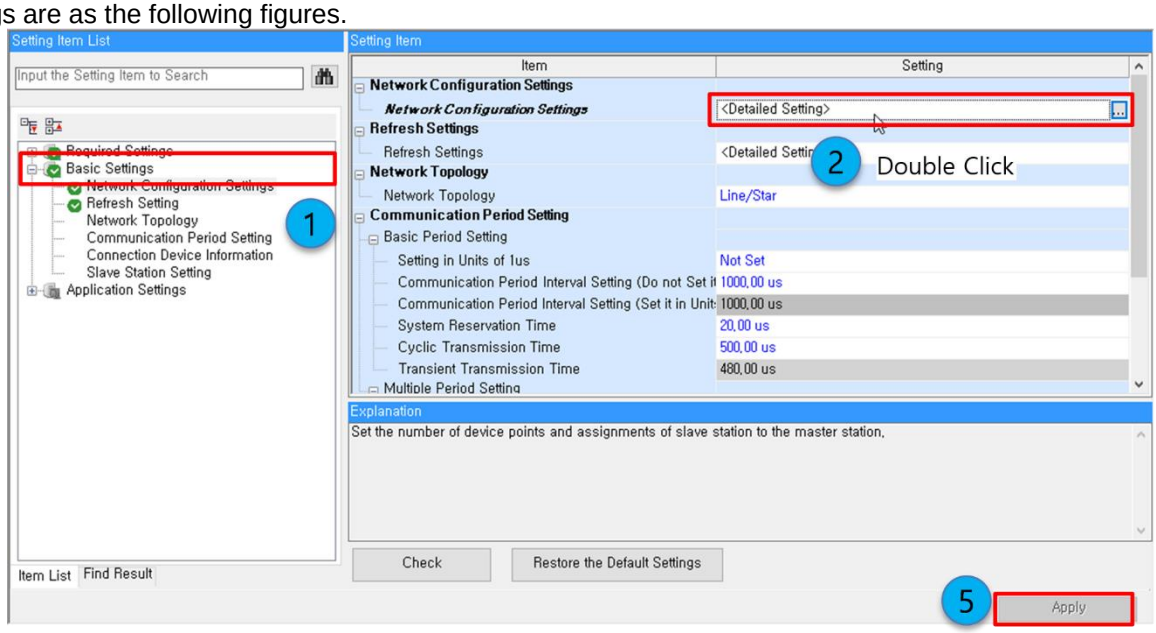


Figure 9-11. Communication module product setting 1

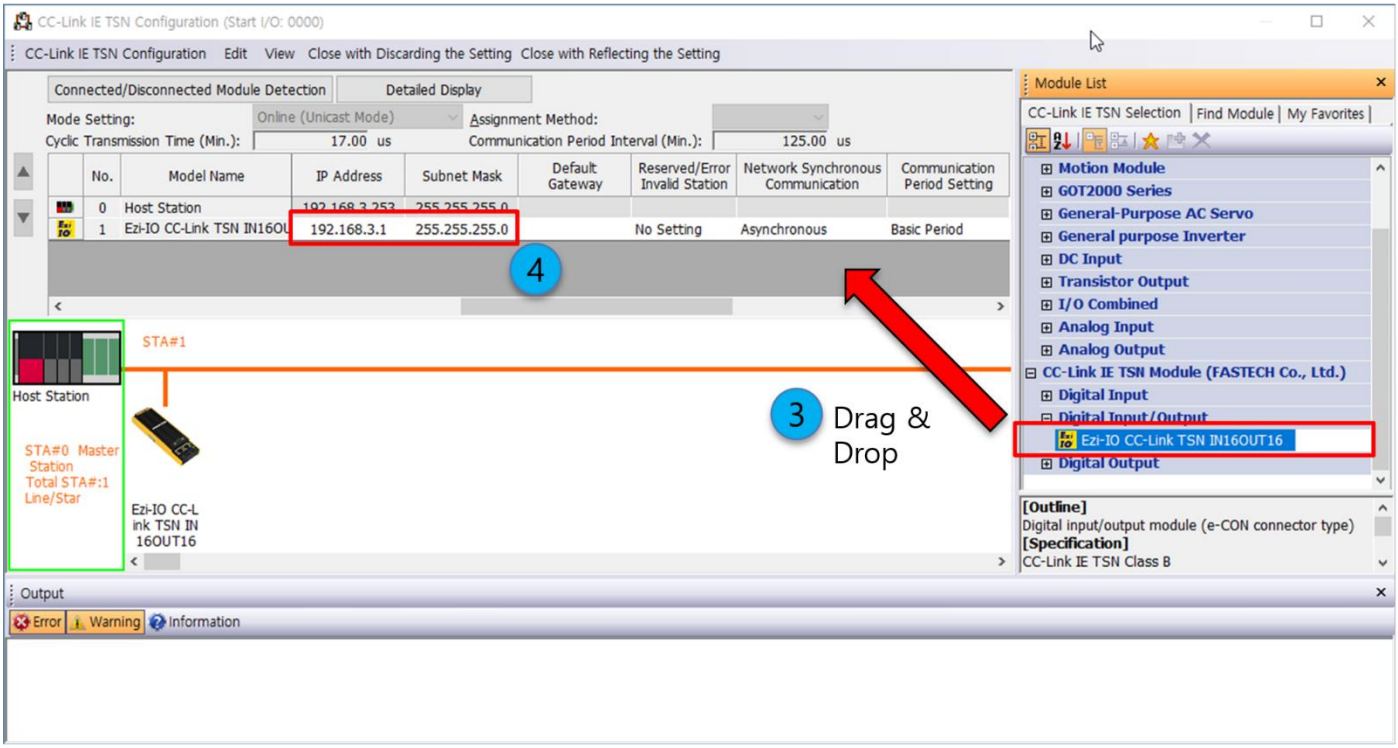


Figure 9-12. Communication module product setting 2

6. Use with PLC programming.

CC-Link IE TSN

スマートファクトリーの構築を加速する

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